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Qualitative study of riccati difference equation on maneuvering target tracking and fault diagnosis of wind turbine gearbox

ABSTRACT

Various performance analyses using Interacting Multiple Model (IMM) algorithm for the stability of tracking a maneuvering target are dealt with the state error covariance. A noble way of analyzing the stability of the IMM algorithm for a linear systems with the upper and lower bounds of the error covariance is analyzed. For this persuasion, a two-model Interacting Multiple Model Kalman Filter (IMMKF) with constant acceleration and constant jerk model has been applied for two different case studies. One is tracking a maneuvering target, and the another is tracking a vibration of wind turbine gearbox, which helps to identify failure component in wind energy system. The required data are collected from a radar and a defected gear box of a test wind turbine, and the efficiency of IMM algorithm is analyzed by simulation experiments.

Keyword: General engineering; General computer science; General engineering; Turbine; Covariance; Computer science; Kalman filter; Differential equation; Control theory; Riccati difference equations; State estimation; Target tracking; Wind turbine; Gearbox